CLAIMS

1. A sensing device comprising an electrode comprising a noble metal layer, on which layer is located a biological material having nitroreductase activity.

2. A sensing device as claimed in Claim 1 wherein the noble metal layer comprises a noble metal selected from the group consisting of gold, silver, platinum, palladium, iridium, rhenium, ruthenium and osmium, or alloys or mixtures thereof.

3. A sensing device as claimed in Claim 1 or 2 wherein the biological material is immobilised on the noble metal layer.

4. A sensing device as claimed in any one of Claims 1 to 3 wherein the biological material is preferably present as a layer on the noble metal layer.

5. A sensing device as claimed in any preceding claim wherein the biological material comprises a plurality of sulphur-containing functional groups.

6. A sensing device as claimed in any preceding claim wherein the biological material is a protein.

7. A sensing device as claimed in Claim 6 wherein the biological material is a nitroreductase enzyme.

8. A sensing device as claimed in Claim 7 wherein the nitroreductase is encoded by a nucleic acid sequence substantially as set out in SEQ ID1 or SEQ ID2.

9. A sensing device as claimed in any preceding claim wherein the biological material is covered by a fluid permeable cover layer.

10. A sensing device as claimed in Claim 9 wherein the cover layer comprises a polycarbonate or polyacrylate material.

11. A sensing device as claimed in any preceding claim wherein the noble metal layer is mounted on an insulating substrate.

12. A sensing device as claimed in any preceding claim wherein the noble metal layer is connected on a surface not comprising the biological material, to one or more layers of conductive, semi-conductive or insulating material.

13. A sensing device as claimed in any preceding claim comprising a gold layer on which is self-assembled a layer of nitroreductase enzyme which has been modified to include a plurality of cysteine residues at a location on the enzyme which does not substantially interfere with the activity of the enzyme.

14. A sensing device as claimed in Claim 13 wherein the nitroreductase enzyme comprises substantially the expression product of the nucleic acid sequence shown in SEQ ID3 or SEQ ID5.

15. A sensing device as claimed in Claim 14 wherein the nitroreductase enzyme comprises a polypeptide sequence substantially as set out in SEQ ID4 or SEQ ID6.

16. A sensing device as claimed in any one of Claims 13 to 15 wherein the nitroreductase is operably associated with an electron mediator.

17. A sensing system comprising a sensing device of any one of Claims 1 to 16, mounted in an electrochemical cell.

18. A sensing system as claimed in Claim 17 wherein the electrochemical cell comprises, in addition to the sensing device, a reference electrode.

19. A sensing system as claimed in Claim 18 wherein the electrochemical cell further comprises a counter-electrode.

20. A method of detecting nitro group containing compounds, the method comprising the steps of:

(a) providing a sensing device of any one of Claims 1 to 16 and a reference electrode;

(b) applying a potential between the electrodes;

(c) measuring the current;

(d) contacting the sensing device with a sample of substrate material to be tested; and

(e) measuring the current change.

21. A method as claimed in Claim 20 further comprising a step (f) of substracting the current change measured with a blank electrode from the value obtained in step (e).

22. A method as claimed in Claim 20 or 21 further comprising a step between steps (a) and (b)of placing the sensing device in a measuring solution.

23. A protein comprising a nitroreductase enzyme which has been modified to comprise a plurality of cysteine residues incorporated into its structure, which cysteine residues are not present in the native enzyme.

24. An isolated nucleic acid sequence comprising a nitroreductase gene modified by the addition of a plurality of codons for cysteine residues.

25. A nitroreductase enzyme as claimed in Claim 23 encoded by a nucleic acid sequence essentially as set out in SEQ ID1 or SEQ ID2.

26. A nucleic acid construct comprising:

(a) a promoter for the expression of a nitroreductase gene;

(b) a plurality of codons for cysteine residues; and

(c) a nucleotide sequence of a nitroreductase gene.

27. A nucleic acid construct as claimed in Claim 26 comprising the nucleic acid sequence set out in SEQ ID3 or SEQ ID5, the reverse complement of said sequences, the complement of said sequences, the reverse of said sequences or sequences having at least 60% sequence identity with the nucleic acid sequences of any one of said sequences.